

What is claimed is:

1. An apparatus for forming a coating film on a substrate by applying a coating liquid to the substrate, which comprises:

5 holding means for holding the substrate horizontally;

a rotation mechanism for rotating said holding means such that the substrate held by said holding means is allowed to rotate in a horizontal plane;

10 a nozzle for dropping the coating liquid on the surface of the substrate; and

gyrating force generation means for giving a gyrating force to the coating liquid dropped from said nozzle.

15 2. An apparatus for forming a coating film on a substrate by applying a coating liquid to the substrate, which comprises:

holding means for holding the substrate horizontally;

20 a rotation mechanism for rotating said holding means such that the substrate held by said holding means is allowed to rotate in a horizontal plane; and

a nozzle for dropping the coating liquid through a hole on the surface of the substrate,

25 wherein a spiral groove is formed on an inner wall of the hole of said nozzle.

3. The apparatus according to claim 2, wherein a

center rod is provided at the center of the hole such that the coating liquid flows easily along the inner wall of the hole.

4. The apparatus according to claim 2, wherein the
5 coating liquid and a dilution liquid for diluting the coating liquid are supplied separately in said spiral groove, they are mixed during passing said spiral groove, the mixed liquid is given a gyrating force and is dropped from said nozzle.

10 5. The apparatus according to claim 2, wherein the hole is tapered toward an exit from which the coating liquid is dropped.

15 6. An apparatus for forming a coating film on a substrate by applying a coating liquid to the substrate, which comprises:

holding means for holding the substrate horizontally;

a rotation mechanism for rotating said holding means such that the substrate held by said holding means is allowed to rotate in a horizontal plane;

a nozzle for dropping the coating liquid through a hole on the surface of the substrate on said holding means; and

25 a plurality of fins provided in the hole of said nozzle so as to flow the coating liquid in a spiral manner.

7. The apparatus according to claim 6, wherein the

coating liquid and a dilution liquid for diluting the coating liquid are supplied separately in the hole, they are mixed during passing the hole, the mixed liquid is given a gyrating force by said fins and is dropped from said nozzle.

5 8. The apparatus according to claim 6, wherein the hole is tapered toward an exit from which the coating liquid is dropped.

10 9. A method for forming a coating film on a substrate by applying a coating liquid to the substrate, which comprises the steps of:

rotating the substrate; and

15 dropping the coating liquid given a gyrating force, which is in the same direction as that of the substrate, at the center of the substrate, thereby easily extending the dropped coating liquid to the circumference of the substrate to reduce the amount of the coating liquid supplied to the substrate.

20 10. The method according to claim 9, wherein a thickness of the coated film is controlled by means of changing a rotation speed of the substrate.

11. A method for forming a coating film on a substrate by applying a coating liquid to the substrate, which comprises the steps of:

25 rotating the substrate; and

dropping the coating liquid given a gyrating force, which is in the opposite direction to that of the

substrate, at the center of the substrate, thereby controlling a extension of the dropped coating liquid to control a thickness of the coated film.

12. The method according to claim 11, wherein a
5 thickness of a coated film is controlled by means of changing a rotation speed of the substrate.